Patent Claims

1. Method and circuit for reducing the crest factor of a data symbol to be transmitted in a multi-carrier data transmission system, in which the data symbol to be transmitted is a function of a multiplicity of signals provided within a predetermined time interval and each of these signals is allocated to a carrier, each carrier in each case occupying at least one frequency from a transmit data spectrum, at least one carrier being reserved which is not provided for the data transmission or at least not to its full extent, comprising the following method steps:

(a) IFFT transformation of a data symbol (X) to be transmitted;

(b) looking for all peak values within a frame of the IFFT-transformed data symbol (Z') the amount of which is above a predetermined threshold;

(c) providing a sample correction function;

(d) allocating a scaling and phase rotation to the sample correction function according to the amplitude and position of the peak values found;

(e) generating a correction signal (D) in the frequency domain from a linear combination of rotated and scaled vectors according to the scaling and position determined;

(f) modifying, particularly reducing the peak value of the data symbol (X) to be transmitted by subtracting the correction signal (D), and

(g) IFFT transformation of the peak-value-modified data symbol (X') into the time domain.

2. Method according to Claim 1, characterized in that after method step (b), oversampling and/or filtering of the IFFT-transformed data symbol (Z) is performed.

3. Method according to one of the preceding claims, characterized in that the modification of the data symbol (X) to be transmitted only takes place in a time

domain and thus method step (g) is performed before method step (f).

4. Method according to one of the preceding claims, characterized in that a dirac-like function is used as sample correction function.

5. Method according to one of the preceding claims, characterized in that at least one reserved carrier of the data symbol (X) to be transmitted is occupied by zero values.

6. Method according to one of the preceding claims, characterized in that at least one reserved carrier is occupied with additional data.

7. Circuit for reducing the crest factor (10), particularly for carrying out a method according to one of the preceding claims, which is arranged at the transmitting end in a multi-carrier data transmission system,

(A) with a transmit path (1) with a data signal (X) to be transmitted;

(B) with a model path (11), which is arranged in parallel with a section of the transmit path (1),

- with a first IFFT module (12) for transforming the data symbol (X) to be transmitted into the time domain,
- with a first unit (15) for determining at least one peak value within a predetermined time interval of the transformed data signal (Z'),
- with a second unit (16) for forming a correction signal (D) in the frequency domain from a linear combination of rotated and scaled vectors according to the scaling and position of the peak values determined;

(C) with a device (17) which is connected to outputs of the model path (11) and of the transmit path (1) and which superimposes on the correction

signal (D) the data symbol (X) to be transmitted on the transmit path (1);

(D) with a second IFFT module (4, 17) for transforming the data symbol (X') modified by the correction signal (D) or only the correction signal (D) into the time domain.

8. Circuit according to Claim 7, characterized in that a third unit (13) for oversampling the data symbol (X) to be transmitted is provided in the model path (11).

9. Circuit according to one of Claims 7 - 8, characterized in that in the model path (11), a filter (14), particularly a non-recursive model filter (14), particularly an FIR filter (14) is provided which has the characteristic of a filter or filter chain (5) following the circuit for crest factor reduction (10).

10. Circuit according to one of Claims 7 - 9, characterized in that a programme-controlled unit (13, 14, 15, 16), particularly a microprocessor or a microcontroller, is provided in which the functionality of the first unit (15) and/or of the second unit (16) and/or of the filter (14) and/or of the third unit (13) is implemented.

11. Circuit according to one of Claims 7 - 10, characterized in that the second IFFT module (17) is of simplified construction compared with the first IFFT module (12), where only the carrier frequencies reserved for the crest factor reduction can be supplied to the second IFFT module (17) and all carriers and/or only the carrier reserved for the data transmission can be supplied to the first IFFT module (4).